WHAT IS CLAIMED IS:

1. A semi-fuel cell stack comprising:

a housing;

an anode and a porous cathode in said housing;

an aqueous catholyte stream flowing within said housing;

an aqueous anolyte stream flowing in said housing; and

means for preventing migration of said catholyte through the porous cathode and into the anolyte stream.

2. A semi-fuel cell stack according to claim 1 wherein said migration preventing means is in contact with said porous cathode.

3. A semi-fuel cell stack according to claim 2 wherein said migration preventing means comprises a material covering a surface of said porous cathode.

4. A semi-fuel cell stack according to claim 2 wherein said migration preventing means comprises a material impregnated into said porous cathode.

5. A semi-fuel cell stack according to claim 1 wherein said catholyte comprises hydrogen peroxide and said migration preventing means comprises a membrane which allows selective ion transfer of OH^- ions through said membrane and into the anolyte stream and which inhibits transfer of hydrogen peroxide through said membrane.

6. A semi-fuel cell stack according to claim 1 wherein said cathode comprises a catalyzed material.

7. A semi-fuel cell stack according to claim 1 wherein said cathode comprise a carbon fiber matrix catalyzed with at least one of palladium and iridium.

8. A semi-fuel cell stack according to claim 1 further comprising means for creating a plurality of flow channels for said catholyte attached to said anode.

9. A semi-fuel cell stack according to claim 8 wherein said flow channel creating means is formed from an electrically non-conductive material.

10. A semi-fuel cell stack according to claim 1 wherein said anolyte stream comprises a NaOH/seawater electrolyte stream.

11. A semi-fuel cell stack according to claim 1 wherein said catholyte comprises an aqueous solution containing a concentration of hydrogen peroxide in the range of from about 0.001% to about 70%.

12. A semi-fuel cell stack according to claim 1 wherein said anode is formed from an aluminum containing material.

13. A semi-fuel cell stack according to claim 1 wherein said catholyte comprises an aqueous sodium hypochlorite solution.

14. A semi-fuel cell stack according to claim 1 further comprising:

at least two anodes within said housing;

at least two porous cathodes within said housing;

means attached to each of said anodes for creating a plurality of flow channels for said catholyte;

means attached to a surface of each of said porous cathodes for preventing migration of said catholyte through each said cathode; and

a plurality of anolyte flow streams within said housing with each of said streams flowing between a surface of one of said anodes and a surface of said migration preventing means.

15. A semi-fuel cell stack according to claim 14 wherein:

each of said anodes is formed from an aluminum containing material;

each of said porous cathodes is formed from a porous material which has been catalyzed with at least one of palladium and iridium;

said anolyte comprises an aqueous seawater/NaOH solution;

said catholyte comprises an aqueous hydrogen peroxide solution; and

said migration preventing means comprises a membrane for allowing a flow of OH^- ions through the membrane into said anolyte stream while inhibiting the transfer of hydrogen peroxide through the membrane.

16. A method for operating a semi-fuel cell stack comprising the steps of:

providing a housing having at least one anode and at least one porous cathode;

flowing a catholyte stream into contact with said at least one porous cathode through at least one catholyte channel;

flowing an anolyte stream into contact with said at least one anode through at least one anolyte channel; and

preventing contact between each respective anolyte stream and each respective catholyte stream.

17. A method according to claim 16 wherein:

said catholyte flowing step comprises flowing at least one stream of an aqueous hydrogen peroxide solution into contact with said at least one porous cathode;

said anolyte flowing step comprises flowing at least one stream of a NaOH/seawater anolyte into contact with said at least one cathode; and

said preventing step comprises providing each said cathode with a membrane which allows OH^- ions to pass through said membrane while inhibiting a flow of hydrogen peroxide through said membrane.

18. A method according to claim 17 wherein said catholyte flowing step comprises flowing said hydrogen peroxide solution at a hydraulic pressure greater than the pressure of the NaOH/seawater anolyte.

19. A method according to claim 17 wherein said catholyte flowing step comprises metering the concentration of the hydrogen peroxide so that said concentration is in the range of from about 0.001% to about 70%.